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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/502,340	02/10/2000	Robert H. Fuerhoff	MEMC 99-0900 (2632)	5009

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SENNIGER POWERS LEAVITT AND ROEDEL
ONE METROPOLITAN SQUARE
16TH FLOOR
ST LOUIS, MO 63102

EXAMINER

ANDERSON, MATTHEW A

ART UNIT PAPER NUMBER

1765

DATE MAILED: 09/12/2003

24

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/502,340

Applicant(s)

FUERHOFF ET AL.

Examiner

Matthew A. Anderson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe et al. (US 4,876,438). (cited in paper 7)

Watanabe et al. discloses a the growth of single crystal ingots by the Czochralski (Cz) method. Fig. 5 pertains to the Cz method and descriptions of the process are found in col. 7 lines 25+ through col. 9-line 36. The diameter of the grown crystal is monitored by the sensor output to the image processing circuit. In col. 8 lines 5-46 the error between the observed diameter and the desired crystal diameter is used to determine the power output to the heater. No temperature measurement is described. The change in power output then effects the temperature of the melt and in turn the diameter of the ingot. This is described as a PID, I^2 and set control. The velocity or pull rate at which the ingot is lift from the melt is described in col. 7 lines 60+ as constant during the straight body portion of the ingot. The lifting speed setter serves as a program setter and sets the lift speed as a function of time (only). The described control of the diameter by power adjustment requires an inherent definition of the temperature model in response to power fluctuations and the resultant effect on

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the ingot diameter. Watanabe et al. describes differential equations as a suitable model of power adjustments to the base power output. Experimentation to approximate diameter control by power adjustment is suggested in col. 8 lines 35-45. Modeling details are included in col. 8 lines 51+ through col. 9 lines 28.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. (US 4,876,438).

Watanabe et al. is described above.

Watanabe et al. does not describe explicitly disclose the differential equation claimed as used to effect the power input to the heater to control the diameter to be as near as possible to the desired diameter.

In response to claims 3-8, 10, it would have been obvious to one of ordinary skill in the art at the time of the present invention to optimize the differential equation model of the diameter control by power adjustment because such is suggested by Watanabe et al. in col. 8 lines 35-40, such optimization would have been achieved with only routine modeling mathematics

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experimentation. The examiner notes that assumption making is included in the solving of the differential equation models and is suggested by Watanabe et al.

In respect to claim 9, it would have been obvious to one of ordinary skill in the art at the time of the present invention to optimize the set pull rate of the ingot because Watanabe et al. discloses defining the pull rate during the entire Cz process and Fig. 5 suggests necking before the constant main body formation, such optimization would have been achieved with only routine experimentation.

Response to Arguments

5. Applicant's arguments with respect to claims 1-10, 19 submitted on 7/1/2003 and 6/2/2003 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew A. Anderson whose telephone number is (703) 308-0086. The examiner can normally be reached on M-Th, 6:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (703) 305-2667. The fax phone numbers for the organization where this application or proceeding is

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assigned are (703) 872-9306 for regular communications and (703) 872-9306 for

After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

MAA
September 11, 2003

Matthew Anderson
A.U. 1765